

includes Ag and Sn, said ternary composition and variants thereof being free of Ti, V, and Zr.

12. (Twice Amended) A solder joint comprising a Pb-free solder including a ternary eutectic composition consisting essentially of about 93.6 weight % Sn-about 4.7 weight % Ag-1.7 weight % Cu having a eutectic melting temperature of about 217°C and variants of said ternary composition wherein the relative concentrations of Sn, Ag, and Cu deviate from said ternary composition to provide a controlled [melting] liquid plus solid mushy temperature range with a liquidus temperature not exceeding 15°C above said eutectic melting temperature, said solder joint having a microstructure comprising beta Sn phase matrix and at least two intermetallic compounds, one intermetallic compound including Cu and Sn and another intermetallic compound including Ag and Sn, distributed uniformly in the beta Sn matrix phase, said ternary composition and variants thereof being free of Ti, V, and Zr.

18. (Twice Amended) A solder joint comprising a Pb-free solder solidified about copper electrical conductors and consisting essentially of about 3.5 to about 7.7 weight % Ag, about 1.0 to about 4.0 weight % Cu and the balance essentially Sn wherein Sn is present in an amount of at least about 89 weight % Sn to promote formation of intermetallic compounds that improve solder wettability on the electrical conductors, said solder being free of Ti, V, and Zr, said solder joint having a microstructure comprising beta Sn phase matrix and at least two intermetallic compounds, one intermetallic compound including Cu and Sn and another intermetallic compound including Ag and Sn, distributed uniformly in the beta Sn matrix phase.

Claim 19, line 2, delete "comprising a".

20. (Twice Amended) In a soldering process involving solidifying a molten solder, the improvement comprising solidifying a Pb-free solder comprising a ternary eutectic composition consisting essentially of about 93.6 weight % Sn-about 4.7 weight % Ag- 1.7 weight % Cu having a eutectic melting temperature of about 217°C and variants of said ternary composition wherein the relative concentrations of Sn, Ag, and Cu deviate from said ternary composition to provide a controlled [melting] liquid-solid mushy temperature range with a liquidus temperature not exceeding 15°C above said eutectic melting temperature and upon solidification at least two intermetallic compounds, one intermetallic compound including Cu and Sn and another intermetallic compound including Ag and Sn, dispersed in a beta Sn matrix phase, said ternary composition and variants thereof being free of Ti, V, and Zr.

22. (Twice Amended) In a soldering process involving solidifying a molten solder about copper electrical conductors in ambient air or an inert gas cover, the improvement comprising solidifying a Pb-free solder consisting essentially of about 3.5 to about 7.7 weight % Ag, about 1.0 to about 4.0 weight % Cu and the balance essentially Sn wherein Sn is present in an amount of at least about 89 weight % Sn to promote formation of intermetallic compounds that improve solder wettability on the electrical conductors, said solder being free of Ti, V, and Zr, said solidified solder having a microstructure comprising a beta Sn matrix and at least two intermetallic compounds dispersed in the matrix wherein one intermetallic compound includes Cu and Sn and another intermetallic compound includes Ag and Sn.

Claim 23, line 5, delete "essentially".

24. (Amended) A Pb-free solder consisting of about 3.6 to about 4.7 weight % Ag, about 0.9 to about 1.7 weight Cu, and the balance [essentially] Sn[, said solder having a microstructure comprising a beta Sn matrix and at least two] in an amount to promote formation of intermetallic compounds [dispersed in the matrix wherein one intermetallic compound includes Cu and Sn and another intermetallic compound includes Ag and Sn] that improve solder wettability on electrical conductor material.

25. (Amended) A solder joint comprising a Pb-free solder consisting of about 3.6 to about 4.7 weight % Ag, about 0.9 to about 1.7 weight Cu, and the balance [essentially] Sn in an amount to promote formation of intermetallic compounds that improve solder wettability on electrical conductor material, said solidified solder having a microstructure comprising a beta Sn matrix and at least two intermetallic compounds dispersed in the matrix wherein one intermetallic compound includes Cu and Sn and another intermetallic compound includes Ag and Sn.

26. (Amended) In a soldering process involving solidifying a molten solder, the improvement comprising solidifying a Pb-free solder consisting of about 3.6 to about 4.7 weight % Ag, about 0.9 to about 1.7 weight % Cu and the balance [essentially] Sn in an amount to promote formation of intermetallic compounds that improve solder wettability on electrical conductor material in ambient air or under inert gas cover, said solidified solder having a microstructure comprising a beta Sn matrix and at least two intermetallic compounds dispersed in the matrix wherein one intermetallic compound includes Cu and Sn and another intermetallic compound includes Ag and Sn.